R. E. NOBLE.

SET SCREW.

APPLICATION FILED DEC. 8, 1911.

1,107,177. Patented Aug. 11, 1914.

Fig. 1

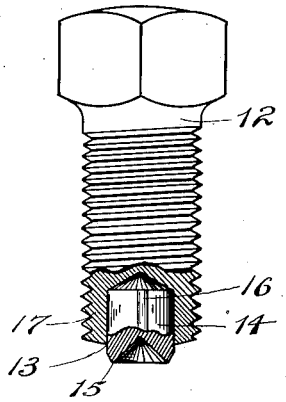


Fig. 2

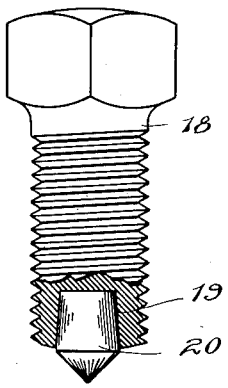


Fig. 3

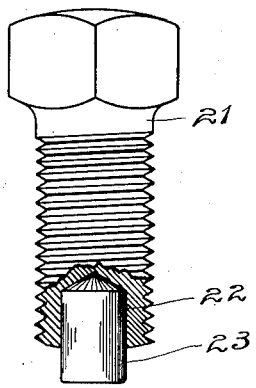


Fig. 4

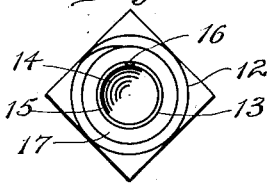


Fig. 5

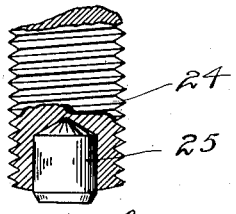


Fig. 6

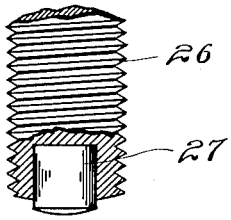


Fig. 7

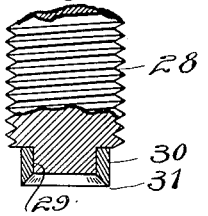


Fig. 8

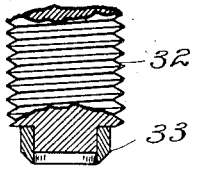


Fig. 9

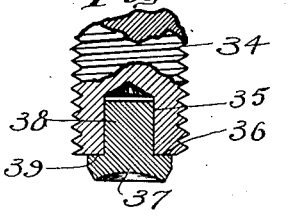


Fig. 10

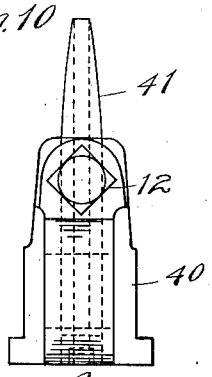
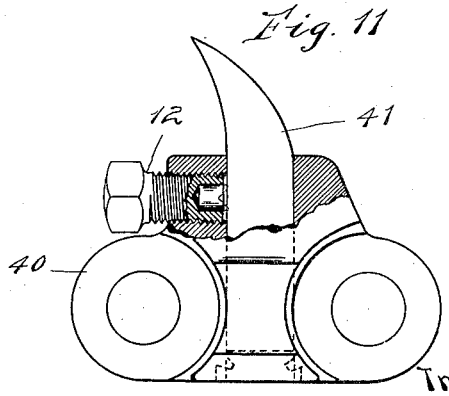


Fig. 11



Witnesses:

Howard A. Redfield.

Robt. Linn

Inventor,

Ralph E. Noble

By Glenn S. Noble

Att'y.

UNITED STATES PATENT OFFICE.

RALPH E. NOBLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO MORGAN-GARDNER ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

SET-SCREW.

1,107,177. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed December 8, 1911. Serial No. 664,560.

To all whom it may concern:

Be it known that I, RALPH E. NOBLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Set-Screws, of which the following is a specification.

While the set screws embodied in my invention may be useful for general purposes, they are particularly applicable for use in connection with mining machine chains for holding the cutter bits in the links, and such combination or use forms one of the special features of my invention. In mining machines having cutter chains, or similar devices provided with cutting bits, it has been the ordinary practice to use set screws for holding such bits in position. As these bits become dull it is necessary to loosen the set screws in order to remove them, and such changing of bits may be necessary many times in a day. This frequent loosening and tightening of set screws causes the points or engaging ends to become battered or dulled, unless such points or engaging end is sufficiently hard. Heretofore, it has been attempted to harden the points without hardening the whole screw, but it is an exceedingly difficult job, and the point is apt to break off. If the whole screw is hardened or tempered, it is apt to be too brittle, so that the screw head is liable to be broken off when the screw is tightened. In order to overcome these objections and to provide a screw which may have a strong, tough body portion with a hard unyielding point or engaging portion, and which may be used repeatedly without injuring the same, I have invented or discovered the improved set screw which is shown in the accompanying drawings.

In these drawings, Figure 1, is a side view of a set screw embodying my invention, such screw having what is commonly known as a "cup point" and being partly broken away to show the interior construction; Fig. 2 is a similar view of another screw showing a sharp point or cone point; Fig. 3 is another similar view showing a screw provided with a flat point, such as commonly used in connection with lathe dogs; Fig. 4 is an end view of the screw shown in Fig. 1; Fig. 5 is a modification showing a "flat point"; Fig. 6 is another modification showing an "oval point"; Fig. 7 is a further modification showing a point formed by means of a sleeve; Fig. 8 shows a slight modification of a sleeve point; Fig. 9 is a further modification showing the point member as formed with a shank and shoulder; Fig. 10 is an end view of a chain link and bit showing the set screw in position; Fig. 11 is a side view of the chain link.

One of the principal features of my invention consists in providing a set screw which may be made of any material most suitable or desirable for the construction of the screw and providing its engaging end with a plug or engaging portion of different material, best adapted to serve for the purpose of engagement with the part which the screw is adapted to hold.

As shown in Fig. 1, 12 indicates a set screw, which for mining machine purposes is preferably made of machine steel or steel which is sufficiently tough and resisting so that the head is not apt to be twisted off, or the screw otherwise broken or injured in ordinary use. The end of the screw is provided with a hole or recess 13, into which is fitted an engaging member or plug 14, having a cup point 15. This plug or engaging member is preferably made to fit tightly in the hole 13, and its inner end is made cone shaped in order to fit the bottom of the hole 13, as such hole would ordinarily be made by drilling into the end of the screw. On account of the plug 14 being given a driving fit, the side thereof may be flattened or grooved as indicated at 16 to allow the air to pass out from the hole as the plug is being forced into place. The walls 17 of the set screw around the hole 13 are preferably left sufficiently thick and strong so that they will not be bulged out or deformed by the engaging plug or point 14. This is particularly desirable as, if the threads are forced out or otherwise deformed at this end of the screw, it would be difficult to remove the screw or to again use it. The plug or point 14 is preferably hardened sufficiently hard so that it will engage with, and cut into the surface of the bit or other part which it is adapted to hold in place, without injury to itself.

As shown in Fig. 2, the screw 18 is provided at its engaging end with a slightly tapered hole 19, having a flat bottom which is adapted to receive the correspondingly tapered sharp pointed engaging member 20.

The screw 21, shown in Fig. 3 is provided at its engaging end with a hole or recess 22, corresponding with the one shown in Fig. 1, but the engaging plug or member 23 is made with a flat or dog point.

The screw 24, shown in Fig. 5 is recessed at its lower end to receive a flat point engaging member 25. The screw 26 shown in Fig. 6 is shown with an oval pointed engaging piece 27 as indicated.

In Fig. 7, the screw 28 instead of being recessed, is turned down at its engaging end to form a shouldered extension 29. Around the extension is fitted the engaging ring or member 30 which fits closely over the extension, and has its inner end resting against the shoulder on the screw, while its outer end is sharpened as indicated at 31, for engagement with the article to be held. In this instance the engaging member 30, is preferably hardened and in order to temper the same and also secure it in position, I prefer to heat it and place it in position and treat it so that it will be shrunk in place and tempered at the same time.

The screw 32 shown in Fig. 8 is provided with an engaging ring or sleeve 33, similar to that shown in Fig. 7, but sharpened by beveling in the opposite direction.

The screw 34 shown in Fig. 9 is provided at its engaging end with a hole 35, which is preferably made smaller than in the ones shown in the preceding figures which leaves a thicker wall for the same sized screw and also a substantial shoulder 36 at the end of the screw. The engaging plug or member 37 is provided with a shank 38, fitting within the hole 35 and with a shoulder 39 adapted to press against the shoulder 36 or end of the screw as indicated. This engaging member is shown with a cup point, but obviously any desired form of point may be used therewith.

While in most instances I prefer to make the screw of comparatively tough non-brittle material, and the point or engaging member of hard or tempered material, such as tempered steel, yet in some instances, as where the set screw is to hold a piece of finished material, such as shafting and it is desired not to injure the same, I may make the engaging point or inset of comparatively soft material, which may be pressed closely in engagement with the article to be held without injuring the same.

As above indicated one of the principal uses of my improved set screw is in connection with mining machine chains. A link 40 of one of such chains is shown in Figs. 10 and 11, having a bit 41 inserted therein in the usual manner, and provided with a set screw 12, embodying my invention. It will be observed that by means of this arrangement, the set screw may be used repeatedly without liability of being broken or having its engaging end flatened or battered out, so as to injure the threads, as frequently occurs when such engaging end or point is not made sufficiently hard.

From the above description it will be observed that my invention may be embodied in various different forms of set screws and I do not wish to be limited to the exact forms shown and described, except in so far as specified in the appended claims, but

What I claim and desire to secure by Letters Patent is:

1. A set screw comprising a threaded body portion formed of iron or soft steel and having a head at one end and a hole in the opposite end, and a hardened steel point fitting tightly within said hole.

2. A set screw having a soft steel threaded body portion with a head at one end and shaped at the opposite end for receiving a point or engaging member, and a hardened engaging member tightly secured to said opposite end.

3. The combination with the barrel portion of a set screw having a hole in the end thereof, of an engaging point or member of extremely hard steel having a shank fitting in said hole, and having a shoulder fitting against the end of the barrel.

RALPH E. NOBLE.

Witnesses:
W. R. CUMMINGS,
GEO. M. LOTT.